PROCEDURE COMMENTS

Please place any helpful information pertaining to this procedure below:

Rev.	Originator / Typist	Date	Comments
3	R.POLHMAN/skc	2/7/97	Minor Changes
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CALLAWAY PLANT

ENGINEERING DEPARTMENT PROCEDURE

EDP-ZZ-04044

FIRE PROTECTION REVIEWS

RESPONSIBLE DEPARTMENT Design Engineering

PROCEDURE OWNER Lee Eitel

WRITTEN BY Lee Eitel

PREPARED BY Lee Eitel

APPROVED BY _____

DATE ISSUED _____

This procedure contains the following:

Pages	1	through	8
Attachments	1	through	5
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This procedure has 0 checkoff list(s) maintained in the mainframe computer.

Conversion of commitments to TRS reference/hidden text completed by Revision Number:

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DEFICIENCY LIST

Section	Deficiency Description	Constraints

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FIRE PROTECTION REVIEWS

1 PURPOSE AND SCOPE

1.1 PURPOSE

This procedure prescribes the methods to be used in reviewing documents to ensure:

1) fire protection requirements are included
2) the fire protection program design bases are not compromised
3) the fire hazards analysis is updated

1.2 SCOPE

1.2.1 This procedure applies to all documents which require a Licensing Impact Review (LIR) per **PROC APA-ZZ-00140 .**

1.2.2 In performing fire protection reviews, it is recognized that a Callaway Plant license condition requires that we maintain in effect all provisions of the approved fire protection program as described in: (**COMN 4516**)

1) Callaway Standard Plant FSAR
2) Site Addendum FSAR
3) As approved in the SER subject to provisions below.

1.2.2.1 Union Electric may make no change to the approved fire protection program which would adversely affect the ability to achieve and maintain safe shutdown in the event of a fire without prior approval of the Commission. **(COMN 5471, O025 2.C.)**

1.2.2.2 To obtain approval of the commission, Union Electric MUST submit an application for a license amendment pursuant to **10 CFR 50.90** .

1.2.3 A change to a feature of the approved fire protection program is considered any change (consistent with the level of detail described in FSAR) to the administrative program, the physical fire protection and detection system, or the Fire Hazards Analysis.

1.2.3.1 **PROC APA-ZZ-00700** , Appendix 2 lists Callaways Fire Protection Program Documents.

2 DEFINITIONS

2.1 Fire Hazards Analysis - An analysis performed to identify potential fire hazards, evaluate the fire protection provided for each hazard, and confirm that a safe shutdown WILL NOT be prevented by a fire in any safety-related area of the plant.

2.1.1 The method of analysis and assumptions and clarifications for fire hazards analyses are defined in the **FSAR 9.5B**.

2.1.2 The safety-related numbered fire areas are delineated on **FSAR 9.5.1-2** .

2.1.3 The Callaway Plant power block fire hazards analysis is documented in **FSAR SP 9.5B** .

2.1.4 The site specific safe shutdown equipment is evaluated in **FSAR SA 9.5B** .

2.2 Fire Protection Program Design Basis - The overall fire protection program is based upon evaluation of potential fire hazards throughout the plant and the effect of postulated design basis fires relative to maintaining ability to perform safe shutdown functions and minimize radioactive releases.

2.2.1 This ability is achieved through adherence to RG 1.120 Fire Protection Guidelines for Nuclear Power Plants and 10 CFR 50 Appendix R, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979.

2.2.2 The basis for compliance with RG 1.120 is the implementation of Appendix A of NRC Branch Technical Position (BTP) APCSB 9.5-1 as clarified in **FSAR 9.5A** . Compliance with Appendix R is as clarified in **FSAR 9.5E**.

2.3 Fire Protection Engineer - One who meets the requirements for membership grade in the Society of Fire Protection Engineers (SFPE). Actual membership in the SFPE, however, is not required **(RFR 019306A , FSAR 9.5.1.5)**

2.3.1 As defined by the SFPE, a Fire Protection Engineer has knowledge of the principles of engineering, is a graduate of an engineering curriculum of accepted standing, and completed not less than four years of engineering attainment indicative of growth in engineering competency and achievement, three of which have been in responsible charge of fire protection engineering work.

2.3.2 If not such a graduate, completion of not less than six years of engineering attainment indicative of growth in engineering competency and achievement, three of which have been in responsible charge of fire protection engineering work, is required.

3 RESPONSIBILITIES

3.1 MANAGER, NUCLEAR ENGINEERING

The Manager, Nuclear Engineering has the overall responsibility for assuring that documents associated with the Callaway Plant are adequately reviewed for fire protection requirements and the fire hazards analysis is updated, as appropriate. **(FSAR 9.5.1.7.1)**

3.2 SUPERVISING ENGINEER, NSSS/HVAC/FIRE PROTECTION DESIGN

The Supervising Engineer, NSSS/HVAC/Fire Protection Design is responsible for maintaining and upgrading the Callaway Plant Fire Protection Program.

3.3 RESPONSIBLE ENGINEER

The Responsible Engineer is responsible for the submittal of a Licensing Impact Review (LIR) or a Design Input Report (DIR), for cross-disciplinary review by the FPE, if required.
(PROC APA-ZZ-00140)

3.4 FIRE PROTECTION ENGINEER (FPE)

3.4.1 The FPE is responsible for reviewing documents and associated LIRs/DIRs which have potential impact on the plant Fire Protection Program. **(PROC APA-ZZ-00700)**

3.4.2 The FPE is responsible for maintaining a record of increases in combustible loading in each fire area included in the FSAR Fire Hazards Analysis.

3.4.3 The FPE is responsible for updating the FSAR Fire Hazards Analysis as necessary when the classification of combustible loading in an area changes. **(PROC APA-ZZ-00700)**

3.4.3.1 The FPE is responsible for updating the plant pre-fire strategies as necessary when the increase in combustible loading changes the loading classification for a room.

4 INSTRUCTIONS

4.1 FIRE PROTECTION REVIEWS BY THE RESPONSIBLE ENGINEER

4.1.1 A Fire Protection screening review is required for all activities which require the completion of an LIR. This is documented in Section 6.1 of **FORM CA1339** .

4.1.2 If any of the Fire Protection screening questions are answered "yes", then a review is required by the Fire Protection Engineer.

4.2 FIRE PROTECTION REVIEWS BY THE FIRE PROTECTION ENGINEER

4.2.1 The Fire Protection Engineer reviews any changes to the plant which are determined to have a potential impact on the Fire Protection Program as determined by the screening questions documented in Section 6.1 of the LIR **FORM CA1339** .

4.2.1.1 The purpose of this review is to verify that all areas of concern have been addressed and that the Fire Protection Program will not be degraded.

4.2.1.2 The Fire Protection Engineer reviews any changes which affects the following items **(PROC APA-ZZ-00140)**

a) An addition of combustible or flammable material. (See section 4.3)

b) A change to a fire protection component (fire barrier, detection system, suppression system, or emergency lighting)

c) A potential affect to the proper function of a fire protection component (detection system suppression system, emergency lighting, or floor drains)

d) A change (addition, removal or modification) to a post-fire safe shutdown component (including its electrical cabling) as listed in FSAR SP Table 9.5B-2.

e) A change to a post-fire safe shutdown procedure

4.2.2 The Fire Protection Engineer evaluates the impact on the Callaway Plant Fire Protection Program.

4.2.2.1 The FPE determines if a revision to the FSAR Fire Hazards Analysis or additional fire protection equipment is required.

4.2.2.2 This determination is to consider items such as:

- change of fire loading classification
- concentration of combustible/flammable material
- size of the fire area
- significance of equipment in the fire area to plant operation and safe shutdown
- value of equipment in the area
- fire protection equipment installed in the area
- physical layout of the area
- discussion presently in the fire hazards analysis for the area.

4.2.2.3 The FPE uses the attachments to this procedure as guidance in determining the impact on the Fire Protection Program.

4.2.3 The Fire Protection Engineer documents his review in Section 6.1 to complete the Fire Protection Review required by Section 6.1 of the LIR **FORM CA1339** .

4.2.4 Any changes which are considered a Change to the Fire Protection Program require approval of the Fire Protection Engineer and the Plant Manager. (**PROC APA-ZZ-00091**)

4.2.5 The FPE should also determine if the document requires approval by Nuclear Electric Insurance Limited (NEIL). NEIL approval is generally required if a change to fire protection equipment or building configuration is involved.

4.2.5.1 If NEIL approval is required, the FPE transmits a copy of the design documents to the appropriate NEIL representative. The FPE coordinates the review process between NEIL and the Responsible Engineer.

4.2.5.2 The FPE should not sign-off a DIR involving NEIL review until NEIL approval is received.

4.2.5.3 The requirement for NEIL approval may be waived at the discretion of the Superintendent, Design Engineering and documented in the LIR/DIR.

4.3 COMBUSTIBLE LOADING EVALUATIONS

4.3.1 The FPE MUST maintain an up-to-date record of the fire loading in each fire area due to permanently installed combustible or flammable material. **(FSAR 9.5B)**

4.3.1.1 If the review determines that combustible/flammable materials are being added to any area listed below, the appropriate CLIP (Combustible Loading Information Program), section should be updated. **(FSAR 9.5B RFR 021144A)**

- a safety-related building
- Communications Corridor
- Laundry Decon Facility (LDF)
- Radwaste tunnels
- South 50 Ft. of the Turbine Building
- Aux. Boiler Room
- RAM Storage Building (RSB)

NOTE:	For insignificant changes (less than 2 pounds), the CLIP update can be waived by FPE.

4.3.2 The Fire Protection Engineer determines if the combustible loading classification as listed in the FSAR Fire Hazards Analysis has been affected by the change. **(FSAR 9.5B, RFR 021144A)**

4.3.2.1 The combustible loading classifications are defined as

Low	Less than 80,000 Btu/sq. ft.
Moderate	80,000 to 159,999Btu/sq. ft.
High	160,000 to 239,999 Btu/sq. ft.
Very High	240,000 Btu/sq. ft. and greater

(RFR 021144A).

4.3.2.2 If the combustible loading for an area is changed such that the combustible loading classification is affected, then an FSAR change should be made. **(FSAR 9.5B, RFR 021144A)**

4.3.2.3 If the classification of loading is changed, then the pre-fire strategies should be revised. **(PROC FPP-ZZ-00000)**

4.3.2.4 For substantial decreases in combustible loading, the CLIP should be changed.

5 REFERENCES

5.1 **PROC APA-ZZ-00140** , Safety, Environmental and Other Licensing Evaluations.

5.2 **PROC APA-ZZ-00143** , 10 CFR 50.59 Reviews

5.3 **PROC APA-ZZ-00741** , Control of Combustible Materials.

5.4 **PROC EDP-ZZ-04032** , Design Input Control.

5.5 FSAR SP

5.6 FSAR SA

5.7 Combustible Loading Information Program (CLIP)

5.8 **PROC APA-ZZ-00700**, Fire Protection Program

5.9 Combustible/Electrical Fire Hazards Analysis (CEFHAP) (File E-190-0122)

6 RECORDS

6.1 QA RECORDS

Fire protection reviews are retained with the associated design documents (LIR/DIR).

6.2 COMMERCIAL RECORDS

None

No. Title: Electric Cable Guidelines

1. Galvanized steel is used in tray construction.

2. Fire protection guidelines for cable spreading rooms are met. Exceptions are referenced in **FSAR 9.5A** , Section F.3.

3. Automatic water fire suppression systems are provided. Exceptions are noted.

4. Cables are designed to allow wetting down without electrical faulting.

5. Safety-related cables meet RG 1.75.

6. Cable and tray penetrations afford the same protection as the barrier penetrated.

7. Fire stops are provided for cable trays at each penetration of a fire-rated floor, wall, or ceiling.

8. Cable in safety-related areas complies to IEEE Std. 383-1974 flame test.

9. Cable trays, raceways, conduit, and cable trenches are used for the routing of cables only.

10. Cable in the Control Room is limited to that necessary for Control Room operation

11. Cables entering the Control Room terminate there.

12. Cable trenches in the floor of the Control Room are provided with fixed automatic total flooding Halon systems

No. Title: Electric Cable Guidelines

13. Fire barrier cable penetration seal designs SHALL utilize only non-combustible materials & SHALL be qualified by tests that are comparable to tests used to rate fire barriers.
    - To be qualified, a cable fire barrier penetration seal SHALL withstand the fire endurance test without passage of flame or ignition of cables on the unexposed side for a period of time equivalent to the fire resistance rating required of the barrier.
    - To be qualified, the temperature levels recorded for the unexposed side of a cable fire barrier penetration seal SHALL be analyzed and demonstrated that the maximum temperature is sufficiently below the cable insulation ignition temperature.
    - To be qualified, a fire barrier penetration seal SHALL remain intact and SHALL NOT allow projection of water beyond the unexposed surface during the hose stream test. **(COMN 533 , COMN 534 , COMN 535 , COMN 536)**

14. Cables, equipment & associated non-safety-related circuits of redundant safe shutdown trains are separated by one of the following:
    - 3-hour-rated fire barrier.
    - horizontal distance of more than 20 ft., with no intervening combustibles or fire hazards, & with fire detection & fire suppression installed in the area.
    - 1 hour barrier with detection and suppression.

15. In lieu of 14 above, "diverse means" for safe shutdown are available and identified in the fire pre-plans **(FSAR 9.5E)**.

16. Safe shutdown equipment and their electrical circuits as identified in **FSAR 9.5B** are reviewed for additions, deletions, or relocations. Changes to the FSAR and CEFHAP, as applicable, will be incorporated.

17. In the cable spreading room aisle, separation between tray stacks is 3 feet wide by 7 feet high.

18. Cables which enter the switchgear room terminate in the room.

No. Title: Control of Combustibles

1. Combustible material (wood, paper, cloth, plastic, flammable/combustible liquids, flammable gasses etc.) added to the following areas should be tracked in the Combustible Loading Information Program (CLIP):

   - a safety-related building,
   - the Communications Corridor,
   - the Laundry Decon Facility (LDF),
   - the Radwaste Tunnels,
   - the South 50 ft of the Turbine Bldg,
   - the Aux. Boiler Room,
   - the RAM Storage Building (RSB)

NOTE:	Cable in conduit is not considered a combustible addition. Components within cabinets could be a combustible if the cabinet is easily opened or has vents. **(FSAR 9.5B)**

2. Combustible loading of greater than 500 lbs. of Class A combustible material to any building or area other than those listed in statement 1 above should be reviewed for affect on Fire Protection capabilities of the area. **(PROC APA-ZZ-00741)**

3. Quantities of greater than 10 gallons of combustible or flammable liquids to any building or area other than those listed in statement 1 above should be reviewed for affect on Fire Protection capabilities of the area.

4. Flammable gases (acetylene, hydrogen, etc.) should not be added to the areas listed in Item No. 1. **(FSAR 9.5.1.2.1)**

5. Combustible/flammable material should not be installed in areas where storage of combustible material is prohibited due to 20 foot separation zone. These zones are identified by red paint on the floor and on **DRAW A-2813** through **DRAW A-2818** . **(RFR 006400A** , **RFR 018137A**, **RFR 016916A)**

6. Safety-related systems are separated from combustibles. Where not practical, special protection is provided.

No. Title: Control of Combustibles

7. All flammable gases used in the Callaway Plant, other than small quantities of specialty gases for laboratory analysis or localized testing, will be stored outside safety-related areas so that a fire involving these gases cannot cause the failure of any safety-related equipment. Flammable bulk gas is not stored inside enclosures containing safety-related equipment. Outside Flammable storage is remote from safety-related structures. **(COMN 4013)**

8. High pressure gas containers have their long axis parallel to building walls. **(COMN 589)**

9. The use of plastic material is minimized.

10. The storage of flammable liquids complies with NFPA 30-1973. Flammable liquids are not stored in buildings containing safety-related equipment. **(COMN 590)**

11. Combustible materials are used in buildings containing safety-related systems or equipment only when suitable non-combustible materials are not available. **(COMN 552)**

12. Outside storage of hydrogen and oxygen SHALL be in accordance with OSHA Standards 1910.103 and 1910.104 respectively, along with NFPA 50A-1973 and NFPA 50-1974 respectively. **(COMN 665)**

13. Combustible materials are controlled and limited to those required for operation in areas housing remote safety-related panels.

14. Combustibles are limited to a minimum in the new fuel area.

15. Combustibles loading in the Laundry Decon Facility is maintained low.

16. Safety-related water tanks are located in areas which contain negligible quantities of combustibles.

17. Dry ion exchange resins are not stored near essential safety-related systems.

No. Title: Fire Suppression and Detection Checklist

This activity does not involve fire protection systems / equipment.

1. The fire alarm system complies with NFPA 72D-1975 for Class A systems.

2. All initiating device circuits (detection circuits) which actuate automatic suppression systems serving safe shutdown areas of the plant are designed to perform their detection functions in the event of a single break or single ground fault in the circuits. For systems such as Halon extinguishing systems which are actuated by two zones of detection in the same hazard area, each zone is not designed to maintain detection capabilities during a single ground fault or break. Upon generation of a trouble signal in one of the fire detection zones, a trouble alarm is sent to the control room. In this condition, the system automatically discharges the Halon on receipt of an alarm signal from the second zone of detection.

3. The detection system gives audible and visual alarm and annunciation in the Control Room and locally.

4. Fire alarms are distinctive and unique. Horn and bell-type alarms are used in both the Control Room and locally. **(COMN 5777 , COMN 5778)**

5. The detection and actuation systems are connected to the non-Class IE dc system which is backed by a battery charger supplied from the plant emergency power supply.

6. The sprinkler systems (both manual and automatic) are supplied from a header which is fed from each end. A separate header, also fed from both ends, is provided for all standpipes except the Reactor Building. The header arrangement is such that no single failure can impair both the sprinkler systems and the standpipe system.

7. Each sprinkler and standpipe system is equipped with OS&Y gate valves to isolate the system. Individual automatic sprinkler systems are equipped with water flow alarms. Water flow in the standpipe systems is indicated by fire pump annunciation.

8. Where sprinkler systems are required in the vicinity of water-sensitive safe shutdown equipment, preaction-type sprinkler systems are installed. Water extinguishing systems are not installed such that both safe shutdown trains would be damaged by system discharge or malfunction.

No. Title: Fire Suppression and Detection Checklist

9. Shutoff valves for each fixed extinguishing system and each main fire protection system header are electrically supervised. Standpipe isolation valves are locked in the open position. All other valves (drain, vent and hose valves) are not supervised

10. Automatic water extinguishing systems are designed, constructed, and tested based on NFPA 13-1975 and 15-1973, as applicable.

11. Interior hose stations are capable of reaching all accessible areas of the plant, including inside the Reactor Building, with an effective hose stream. In addition, a fire in the immediate vicinity of a hose station can be extinguished, using an adjacent hose station.

12. All hose stations, except the hose stations protecting the diesel generator rooms and cable spreading rooms, are equipped with 75 feet of 1-1/2 inch woven jacketed, lined fire hose and adjustable nozzles. The hose stations protecting the diesel generator rooms and cable spreading rooms are equipped with 100 feet of hose to provide effective coverage for all accessible areas. The hose stations are spaced at not more than 100 feet from an adjacent hose station. Standpipe risers are of at least 4-inch diameter for multiple hose connections. The standpipe system is in accordance with NFPA 14. **(COMN 4014)**

13. Hose stations are located outside entrances to normally occupied areas and inside normally occupied and unoccupied areas, where possible. All hose stations are equipped with pressure reducing devices where required by code. Standpipe isolation valves are located outside of safe shutdown equipment areas, where possible.

14. Combination spray/straight-stream nozzles are provided for all interior hose stations, except in areas with sensitive electrical equipment. In these areas, nozzles will be Class "C" type.

15. No foam extinguishing systems are provided in the power block buildings.

16. Halon extinguishing systems are in accordance with NFPA 12A. Only approved agents are used.

17. Each Halon system is capable of attaining a 5-percent minimum concentration. Each system is designed to maintain a 5-percent minimum concentration at the highest combustible material in the hazard area for 10 minutes.

No. Title: Fire Suppression and Detection Checklist

18. Halon system actuation is by a cross-zoned, ionization-type detection system. Detection by the first zone alarms locally and in the Control Room. Detection by both zones WILL sound a local horn, close required dampers, shut off associated ventilation and/or air conditioning fan motors, and will discharge after a time delay for personnel evacuation. A momentary contact abort switch is provided in each local panel to delay the discharge for evacuation purposes. Each local control panel has a separate key lock switch to disable system controls during maintenance operations. At such times, the system will indicate "trouble" on the annunciator panel in the Control Room. A 100-percent reserve bank is provided for each Halon system.

19. The Halon system design and application considers concentration and soak time; toxicity and corrosive characteristics.

20. No carbon dioxide extinguishing systems are used in the power block buildings.

21. Portable fire extinguishers for manual extinguishment of fires are provided throughout normally accessible areas of the plant in accordance with NFPA 10-1975 & OSHA & NEIL regulations & recommendations. All extinguishers are installed with consideration given to cleanup problems and adverse effects to equipment in the hazard area. **(COMN 4065 , COMN 43153 , COMN 43154)**

22. Standpipes with hose stations or portable fire extinguishers are located to provide coverage of safety-related areas.

23. Design documents include abnormal inspection requirements or performance testing procedures or checklists.

24. Modifications to main fire loop follow NFPA 24.

25. Unlined steel pipe is used in the fire mains. The pipe is oversized.

26. Means to flush the fire protection system are provided.

27. The fire protection system piping is not interconnected with any sanitary or service water systems.

No. Title: Fire Suppression and Detection Checklist

28. Fire protection system water supply can take maximum expected flow rate for two hours. This cannot be modified by any design change.

29. Lakes or fresh water ponds are not used for fire protection water supply nor is the supply common with any other water supply. **(COMN 457)**

30. Hydrants are installed approximately every 250 feet on the yard main system. The lateral to each hydrant is furnished with a curb valve. **(COMN 826)**

31. Fire protection system valves that are not electrically supervised with indications in the Control Room are locked in the proper position.

32. Fire hydrants are provided near safety-related water tanks. Fire fighting equipment is supplied by two mobile units. **(COMN 5825)**

33. Fire pumps and controllers are Underwriter's Laboratories and Factory Mutual rated. **(COMN 608)**

34. Manual hose stations & portable hand extinguishers are available as backup to sprinkler systems.

35. Sprinkler systems are not installed in areas where sprinkler operation can cause damage to safe shutdown equipment.

36. Fire pumps & controllers are installed & tested in accordance with NFPA 20-1974. **(COMN 594)**

37. Hose stations & portable extinguishers are available to manually extinguish any fire in the ESW pumphouse area. **(COMN 599)**

38. Two separate water supplies SHALL be provided to furnish necessary water volume & pressure to the fire main loop. **(COMN 823)**

39. Post indicator sectional isolation valves SHALL be installed in the fire main loop to permit isolation of portions of the fire main loop for maintenance or repair without interrupting the entire water supply. **(COMN 825)**

No. Title: Fire Suppression and Detection Checklist

40. Extinguishing materials used in fire protection system will be compatible with the equipment in the areas served. **(COMN 465)**

41. The containment isolation valves in the fire protection system SHALL be selected, tested & located in accordance with the requirements of 10CFR50, Appendix A, General Design Criteria 54 & 56 & 10CFR50, Appendix J, Type C Testing. **(COMN 5502)**

42. 2 1/2-inch & 1 1/2-inch hose will be provided for the fire protection system and both fire fighting equipment mobile units. **(COMN 458)**

43. Fire protection SHALL be provided in accordance with the requirements of 10CFR50, Appendix A, GDC-3. **(COMN 5501)**

44. Manual fire suppression equipment SHALL be available to extinguish a fire in the UHS cooling towers area. **(COMN 601)**

45. Manual fire suppression equipment SHALL be available to extinguish a fire in the Power Block area (east of Reactor Building & west of Fuel Building). **(COMN 602)**

46. Where automatic extinguishing systems are provided, appropriate back-up fire suppression capability is provided.

47. Fire detection & extinguishing equipment SHALL be provided in areas containing plant radio communication equipment. **(COMN 593)**

No. Title: Ventilation

1. Fire and smoke are automatically isolated in all areas of the Auxiliary, Radwaste, Fuel, and Control Buildings.

2. Smoke and gases potentially containing radioactive materials are monitored for radioactivity releases.

3. Exhaust fans and motors are rated for, or protected from, damaging heat and smoke.

4. There are no fans provided specifically for the function of smoke exhaust.

5. Power cables for exhaust fans are physically separated for Class IE fans. Non-IE exhaust fans for the Reactor and Control Buildings are located in the Auxiliary Building. Diesel Building has no mechanical exhaust. Control cables for mechanical ventilation systems, except isolation dampers, are run outside the fire area served by the system.

6. A low-flow air bleed system is provided, per Regulatory Guide 1.52, to charcoal absorbers when the iodine loadings approach 2.5 mg/gm. Charcoal absorber units are equipped with a high temperature detection system which alarms in the Control Room and a manually activated water spray system for the charcoal bed.

7. Fresh air intakes for safety-related equipment are located remote from the exhaust air outlets.

8. Smoke and heat ventilation is provided as needed. See NFPA No. 204.

9. Ventilation systems serving areas protected by Halon 1301 are provided with isolation capabilities.

10. Ventilation openings in fire barriers are protected by fire dampers having a rating equal to the barrier.

11. Ventilation systems in battery rooms are capable of maintaining the hydrogen concentration well below two-volume percent. .

No. Title: General Design

1. Safety-related systems are isolated from fire hazards. Where this is not possible, protection is provided by fire retardant coatings, fire detection, fire suppression systems, or a combination of these.

2. Redundant safety-related systems and associated power and control circuits are isolated from one another and where this is not possible, protection is provided by fire retardant coatings, fire detection, fire suppression, or a combination of these.

3. Interior structures, insulation, shielding, and soundproofing are noncombustible. Interior finishes are noncombustible or listed by a nationally recognized testing laboratory for flame spread, smoke and fuel contribution of 25 or less; where this criteria cannot be met for special reasons, consideration is made in the fire hazards analysis

4. Suspended ceilings and supports are of noncombustible construction. Enclosed areas contain no combustibles. Adequate fire detection and suppression systems are provided where full implementation is not practical.

5. High-voltage/high-amperage transformers exposed to safety-related systems are dry-type.

6. Buildings containing safety-related systems and having openings in exterior walls are 50 feet from flammable or combustible oil-filled transformers

7. Floor drains are large enough for firefighting water flow. Design changes to the drain system subsequent to the original design have provisions for preventing the spread of fire throughout the drain system. **(RFR 019254A)**

8. Floors, walls, and ceilings enclosing separate fire areas have a three hour rating. Penetrations and doors have the equivalent rating. A fire hazards analysis has been made to verify the adequacy of the barrier. If the barrier is not adequate, fire detection and suppression are to be provided. Elevator doors are rated at the industry standard, 1 1/2 hours.

9. Fire doors are provided with closing mechanisms. **(COMN 537)**

10. Fire Areas are as defined in **FSAR 9.5.1-2** .

No. Title: General Design

11. This activity does not involve the addition, removal or modification of walls, floors, ceilings or complete rooms. (Note that breaching and resealing an existing penetration does not constitute a modification to a wall, floor or ceiling.)

12. This activity does not involve the addition of a new penetration through a fire-rated wall, floor or ceiling.

13. This activity does not involve the addition, removal or modification of safe shutdown equipment, which would impact the ability of the plant to achieve and maintain safe shutdown in the event of a fire per the requirements of 10 CFR 50, Appendix R.

14. This activity does not adversely affect the time to operate safe shutdown equipment in the event of a Control Room fire (actions taken per **PROC OTO-ZZ-00001**).

15. Emergency lighting units SHALL be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes. **(FSAR 9.5.1.2.2.5** , **FSAR 9.5.3.2.3)**

16. The emergency lighting units (for item above) are sealed-beam units with at least an eight-hour battery power supply. **(FSAR 9.5.3.2.3)**

17. New hazards introduced in the Containment have been identified and fire suppression systems provided on the basis of a fire hazards analysis. For example: lubricating oil or hydraulic fluid for the primary coolant pumps; cable tray arrangements and cable penetrations; charcoal filters.

18. No safety-related equipment is located above the ceiling in the diesel generators area.

19. Diesel oil storage tanks are buried no closer than approximately 23 feet from the diesel generator building wall.

20. The addition of, or design change to, safety-related pumps does not change the fire hazards analysis.

21. Materials that collect and contain radioactivity are stored in closed metal tanks or containers located in areas free from ignition sources.

No. Title: General Design

22. The safety-related cooling tower structures associated with the ultimate heat sink are constructed of non-combustible materials, with the exception of the cooling tower fan blades and the fan cylinders.

23. The lubricating oil system for each reactor coolant pump is provided with enclosures and drip collection pans to contain and drain away from the pump any leakage from this system.

    High pressure portions of the lube oil system are totally enclosed with low point drain connections. Low pressure portions of the system are provided with drip pans with low point connections. All low point connections are piped to a remote oil collection tank (over 300-gallon tank for each two reactor coolant pumps - each pump lube oil system holds 265 gallons of oil) located inside the Reactor Building. The tanks have level indication and level alarm annunciation in the Control Room. The tank vent is equipped with a flame arrestor. **(FSAR 9.5A , FSAR 9.5B , FSAR 9.5E)**

24. Site facility structures SHALL be provided with lightning protection &/or an effective grounding system to minimize the effect of lightning strikes. Lightning protection for the Containment is provided in accordance with NFPA 78-1975 & the requirements of UL-96A-June, 1963. **(COMN 664)**

25. Storage tanks that supply water for safe shutdown SHALL NOT be located within 50 ft. of any other combustible structures or stored materials. **(COMN 5825)**